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GEOLOGIC STRUCTURE OF THE DEVONIAN-SILURIAN HUNTON LIMESTONE MEGAGROUP IN ILLINOIS

D. L. Stevenson

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GEOLOGIC STRUCTURE OF THE DEVONIAN-SILURIAN HUNTON LIMESTONE MEGAGROUP IN ILLINOIS

D. L. STEVENSON AND L. L. WHITING

ABSTRACT

A geologic structure map, contoured on the top of the Devonian-Silurian Hunton Limestone Megagroup, has been drawn to a scale of 1:500,000. The map shows structural contours with 100-foot intervals, county boundaries, and township and range lines. As future revisions are made, blue-line reproductions of the revised map will be available.

INTRODUCTION

The Hunton Limestone Megagroup (Swann and Willman, 1961, p. 478-480) consists of predominantly carbonate rocks of Silurian and Devonian age. Over most of its areal extent in Illinois, the Hunton underlies the New Albany Shale Group of Upper Devonian and Lower Mississippian (Kinderhookian) age and overlies the Maquoketa Shale Group of Upper Ordovician (Cincinnatian) age.

In much of Illinois, the upper part of the Hunton comprises various limestone formations of Middle Devonian age, called the "Devonian lime" by drillers. In large areas, however, the Middle Devonian components are lacking, and thus various Lower Devonian or Silurian formations, called the "Niagara lime," form the top of the Hunton.

The top of the Hunton Megagroup, in general, is the same horizon as the base of the New

Albany Shale, which has been used previously by Weller (1936) and Bell (1943) in mapping the structure of Illinois. Since this earlier work, additional subsurface data have been made available through the drilling of oil test holes that penetrated the Devonian or older rocks. A study of Devonian and Silurian rocks in central and western Illinois by Whiting and Stevenson (1963) presents a structure map contoured on the top of the Hunton Megagroup. The map accompanying the present report is an expansion of that map and includes nearly all of that part of Illinois in which the Hunton is overlain by the New Albany.

Acknowledgments

The authors wish to express appreciation to the many people who have assisted with this project. Helpful advice was freely given by members of the Illinois State Geological Survey's Stratigraphy and Areal Geology Section. E. A. Ather-



ton was particularly helpful with the structural interpretation of extreme southern Illinois. H. R. Schwalb, of the Kentucky Geological Survey, supplied structural data of portions of Kentucky and Indiana adjacent to Illinois that aided greatly in the completion of this map.

EXTENT OF MAPPED AREA

Figure 1 shows the outline of the mapped area and its relation to major tectonic features in and around Illinois. The northern limit is the northern edge of the New Albany Shale. Although the Hunton Limestone extends some distance north of this line, its top is a surface beveled by pre-Pennsylvanian and pre-Pleistocene erosion, and, therefore, it is unsuitable for structure mapping.

The eastern boundary of the mapped area is the Illinois-Indiana border. The western boundary follows the Mississippi River, except for the few places where the Hunton has been removed by erosion in Adams, Pike, Calhoun, and Monroe Counties. In extreme southern Illinois, the map extends from a line formed by the Ste. Genevieve Fault and the eroded edge of the New Albany Shale Group to the Ohio River and eastward to the west edge of the Dixon Springs Graben. The southeasternmost portion of Illinois has not been mapped because of the complex faulting and the presence of only two drill holes that penetrated the top of the Hunton. The location of these holes and the elevation on top of the Hunton are shown on the map.

DENSITY OF CONTROL

Figure 2 illustrates the distribution and density of control used in preparing the structure map. About 4300 data points were used on the original work map, which was drawn to a scale of 1:250,000. In areas of dense drilling, the control was limited to one point per section. Plate 1 has a scale of 1:500,000, which precludes exact location of data points with symbols of suitable size, and, therefore, no data points are shown except the two mentioned above.

In the area of Hamilton, White, Saline, and Gallatin Counties, the control points are too sparse to provide adequate data for structural in-

terpretation. In these counties, the elevation of the top of the Hunton was estimated by combining structure maps of the middle "massive" member (Scottsburg Member) of the Menard Limestone (Siever, 1951; Swann, 1951) and a thickness map of the Menard to Hunton interval (unpublished map).

The sparsely drilled and complexly faulted area south of T. 10 S. in extreme southern Illinois was mapped by relying heavily on structure mapping on shallower horizons (Weller, 1940). The faults shown in this area are essentially the same as those shown on the geologic map of Illinois (Willman et al., 1967). A few additional faults are based on Ross's (1963) interpretation.

SOURCES OF DATA

The basic data on holes drilled to the top of the Hunton or deeper are kept on a separate set of well tickets by the Oil and Gas Section of the Illinois State Geological Survey. The complete records of these holes are kept on open file in the Mineral Resource Records Section. Electric logs and sample studies from these sources provided information for determining the top of the Hunton in most of the holes used. In a few cases where other information was lacking, drillers' logs were of sufficient quality to provide a reliable top.

FUTURE WORK

As additional holes are drilled to the Hunton Megagroup, the elevation of that horizon will be checked against the contours on the structure map. Whenever this new drilling supplies data that necessitate major revisions in the map, the revisions will be made and blue-line copies of the revised map will be available upon request. Notice of the availability of the revised map will be given in the Geological Survey's Monthly Drilling Report as well as in the regular notice of Survey publications. The commercial well scouting services operating within the area will also be notified.

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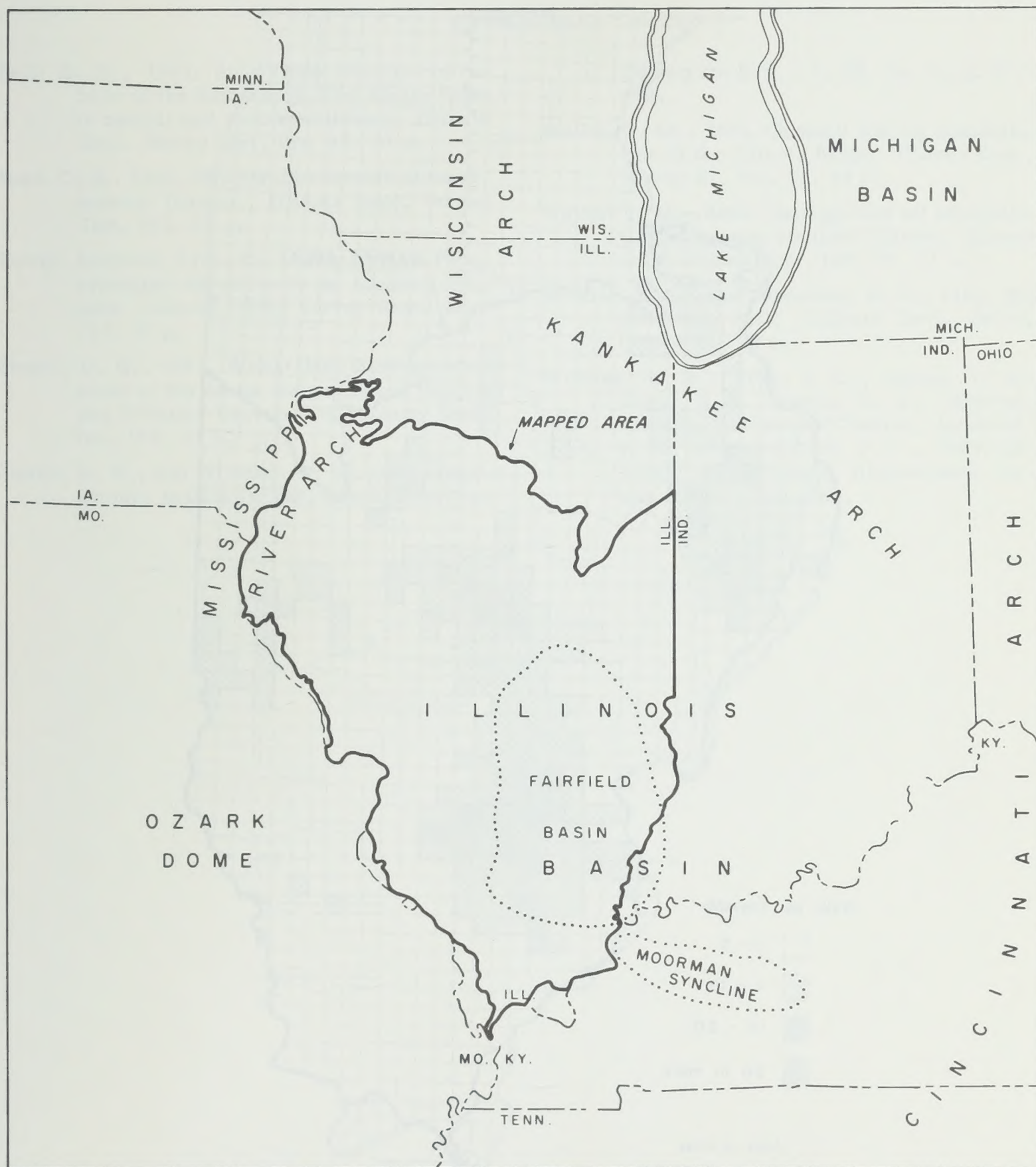


Figure 1 - Index map showing mapped area as related to major tectonic features.

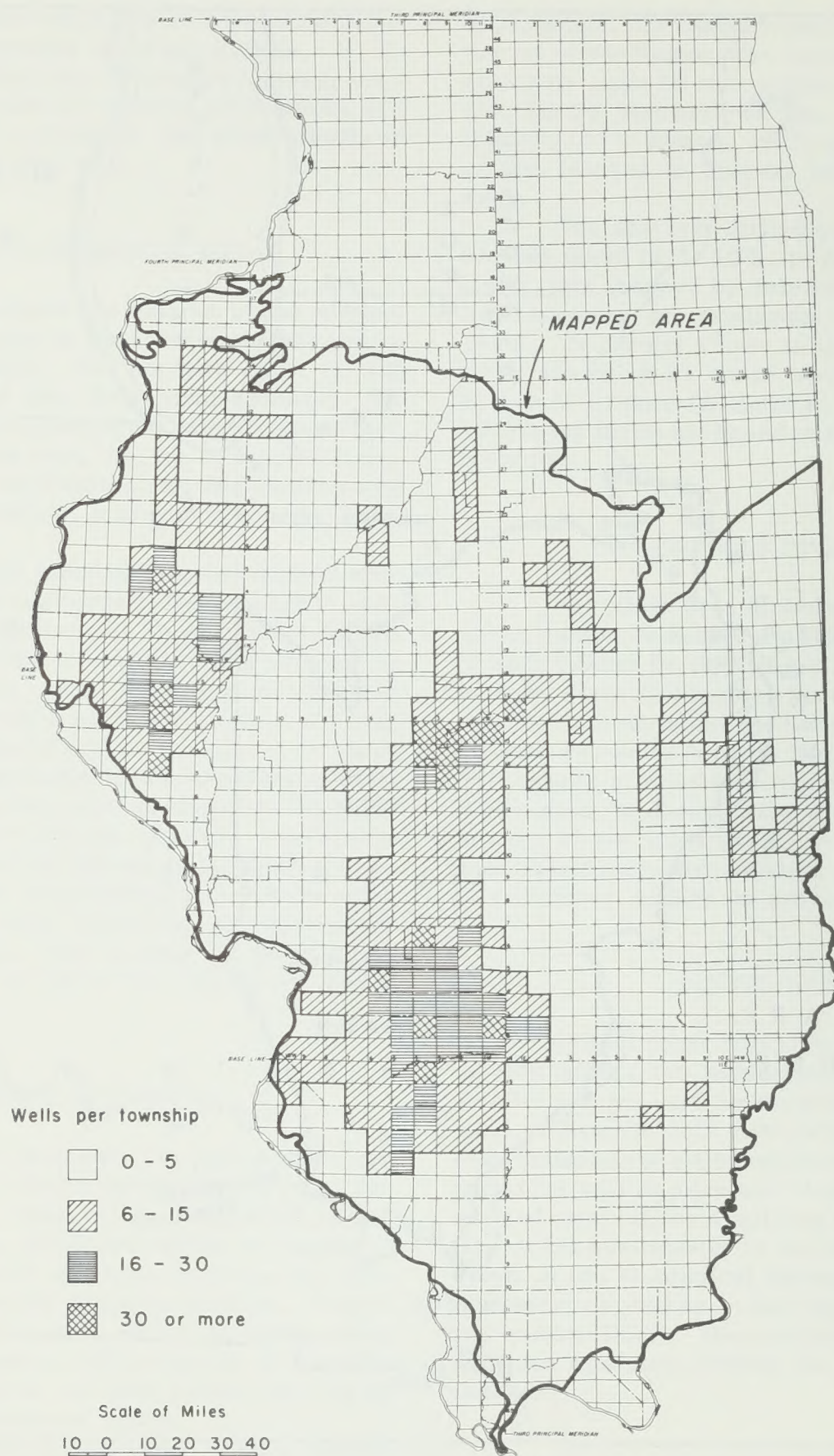
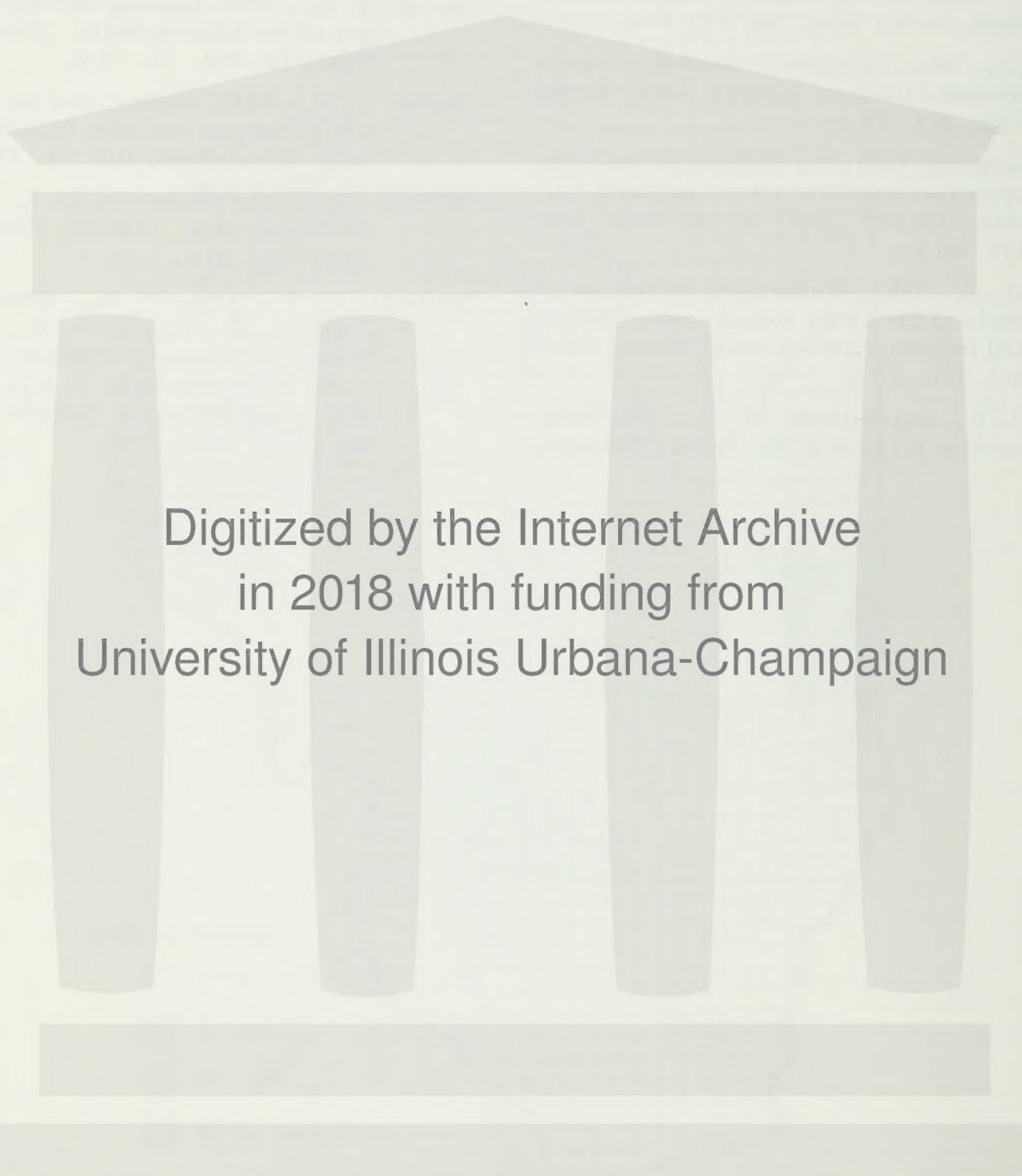


Figure 2 - Density of subsurface datum points used in construction of structure map.

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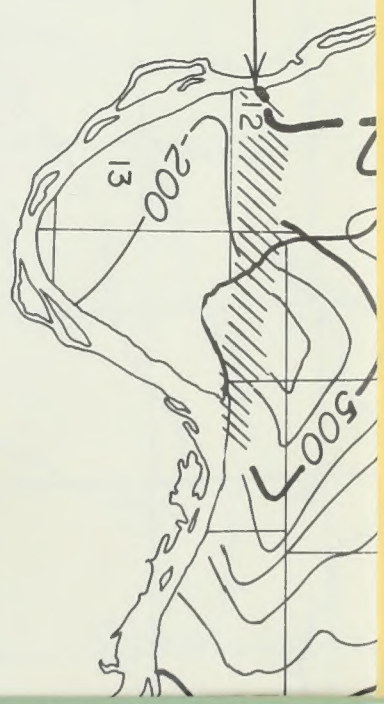
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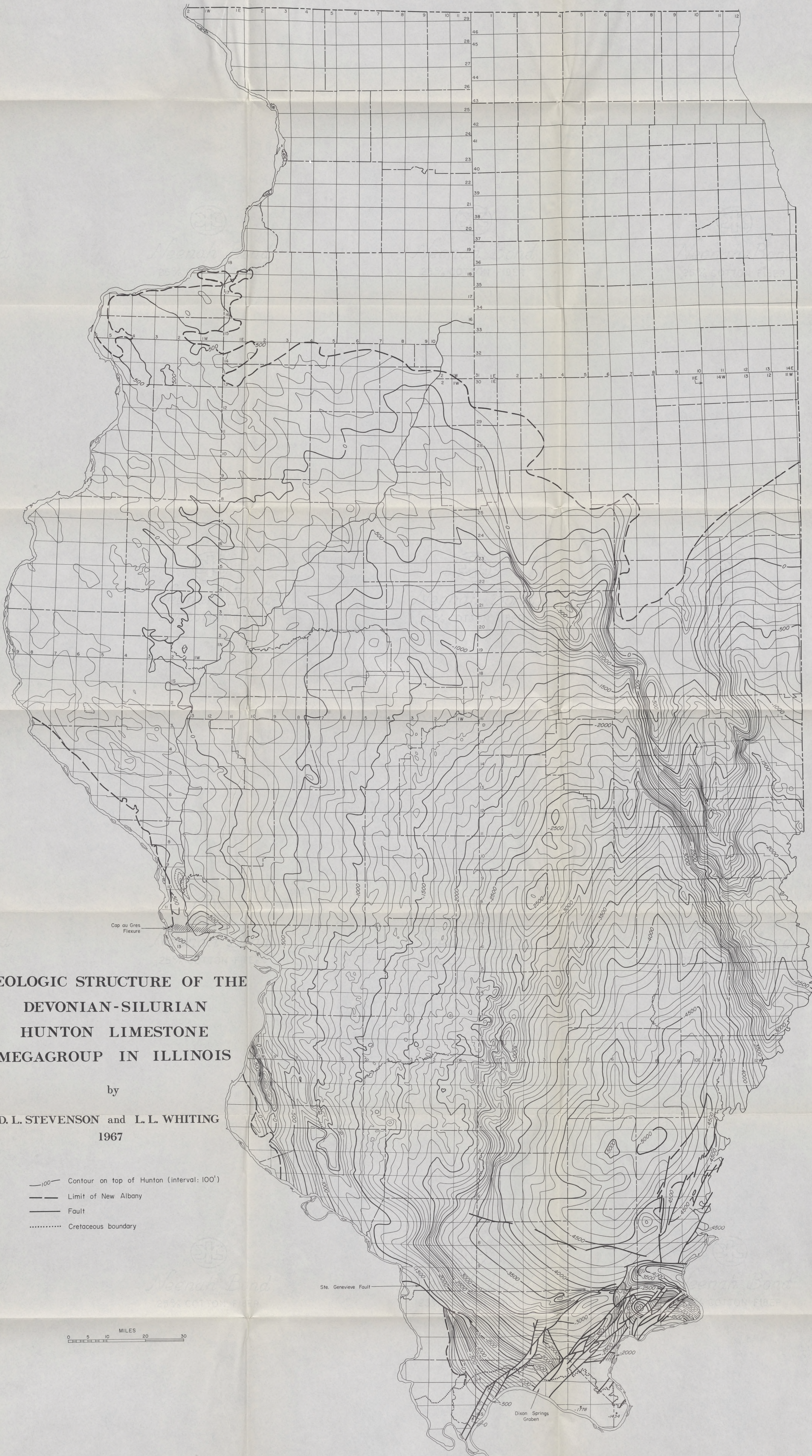
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- 100— Contour on top of Hunton (interval: 100')
--- Limit of New Albany
— Fault
..... Cretaceous boundary

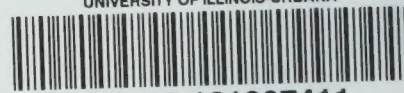
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